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The sabulicolous fungi from Sicily (southern Italy): additions and critical review

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Abstract — The ecological and distributive data on 165 sabulicolous taxa (29 *Ascomycetes* and 136 *Basidiomycetes* representing 89 genera and 48 families) collected from Sicily in southern Italy are reported. New additions are cited, and data reported in literature for the Sicilian territory is critically reviewed. The full checklist is available on http://www.mycotaxon.com/resources/ weblists.html

Key words — distribution, ecology, arenicolous fungi

Introduction

The wide literature on fungi growing on sandy dunes (cfr. the complete list reported in the full checklist on the Mycotaxon web site) were checked with particular reference to the Italian territory and integrated with new data arising from field excursions carried out by authors in Sicily (southern Italy). The aim was to critically analyze the data reported in literature and to draw up an exhaustive picture of sabuliculous fungi growing in Sicily.

Materials and methods

Data on recorded taxa are referred to habitat, collection localities, and cartographic reference; notes pertain only to taxa in found sandy environments and not to the general distribution in Sicily. The literature reported by Contu & Signorello (1999) and Signorello & Contu (1999) were also considered, but no critical examinations were made since the cited samples are not kept in the herbaria of Catania (CAT) and Cagliari (CAG). The distributive data were referred to the grid map 1:50.000 of the Official Map of the Italian State (I.G.M.I.), following the methodology proposed by Padovan (1994). Nomenclature was checked according to Index Fungorum (http://www.indexfungorum.org/Names/Names.asp). Exsiccata are kept in the Herbarium Mediterraneum of Palermo (PAL), the

Royal Botanic Gardens of Kew (K), the National Botanic Garden of Belgium (BR), and the personal herbarium of the first author (A.L.).

Conclusions

The littorals and sandy dune areas of Sicily have been strongly modified by anthropic pressure, fragmentation into lots for tourist villages and residences, and reforestation. Nevertheless the coastal belts still host interesting plant and fungal species. The reported number of macromycetes is 35 taxa (14 *Ascomycetes* and 21 *Basidiomycetes*) collected on embryo dunes, high dunes, rear dunes, and consolidated dunes and 114 taxa (12 *Ascomycetes* and 102 *Basidiomycetes*) from reforested consolidated dunes. Fungi with uncertain habitats correspond to 14 taxa (3 *Ascomycetes* and 11 *Basidiomycetes*). Two *Basidiomycetes* were excluded from the sabuliculous environment since they grow in a strongly anthropized area. 165 taxa (29 *Ascomycetes* and 136 *Basidiomycetes*) representing 160 species and 5 varieties were reported. As shown in Fig. 1, saprobes comprise the main ecological category (119 taxa), followed by mycorrhizal (33) and parasitic (13) taxa. According to substrate (Fig. 2), there are 111 terricolous, 24 lignicolous, 20 debris, and 10 bryophilous fungal taxa.

Embryo dunes, which are exposed to high winds and salt, host only few fungi species. On higher dunes, where the vegetation was substituted by *Medicagini marinae-Ammophiletum australis* and characterized by big tufts of *Ammophila australis, Peziza ammophila* Durieu & Mont. 1846 is one of first to appear at the end of November with a progressive increase of fructification in the following months. *Agaricus aridicola* Geml et al. 2004, *A. menieri* Bon 1981, *Hebeloma ammophilum* Bohus 1978, *Inocybe serotina* Peck 1904, *Lepiota brunneolilacea* Bon & Boiffard 1972, *Marasmius anomalus* Lasch ex Rabenh. 1854, *Panaeolus cinctulus* (Bolton) Britzelm. 1883, *Peziza ammophila*, *P. pseudoammophila* Bon ex Donadini 1978 and *Rhodocybe malenconii* Pacioni & Lalli 1985 were observed fruiting close to *A. australis. Agaricus aridicola*, *Panaeolus cinctulus*, *Peziza ammophila*, *P. pseudoammophila* and *R. malenconii* are considered strictly arenicolous species with a wide spectrum of diffusion. In the level stretch of rear dunes *Centaureo-Ononidietum ramosissimae* associates with only a few species such as *Arrhenia spathulata* (Fr.) Redhead 1984, *Galerina laevis* (Pers.) Singer 1961, and *Peziza boltonii* Quél. 1879. In the consolidated dunes a very interesting psammophilous maquis is observed. The plant association is mainly represented by *Juniperus macrocarpa* that is located on coastal dunes belonging to the *Ephedro fragilis-Juniperetum macrocarpae*. Due to wave action this plant association occupies a belt very close to the seashore. A huge number of fungi such as *Arrhenia spathulata*, *Agaricus devoniensis* P.D. Orton 1960, *Conocybe filaris* (Fr.) Kühner 1935, *Geopora arenicola* (Lév.) Kers 1974, *G. arenosa* (Fuckel) S. Ahmad 1978, *Hymenoscyphus conscriptus*

(P. Karst.) Korf ex Kobayasi et al. 1967, *Marasmiellus trabutii* (Maire) Singer 1951, *Pithya cupressi* (Batsch) Fuckel 1870, *Smardaea planchonis* (Dunal ex Boud.) Korf & W.Y. Zhuang 1991, and *Xerula mediterranea* (Pacioni & Lalli) Quadr. & Lunghini 1990 grows close to the shrubs. In consolidated dunes within the investigated coastal region, reforested areas are found that generate a protective windbreak against salt. The coastal natural vegetation has been replaced by alien plants such as *Acacia saligna*, *Pinus pinea*, *P. halepensis*, *P. pinaster,* and *Eucalyptus camaldulensis* that negatively affect the environment and impede a natural plant succession. Fungi are the most abundant in such areas, and rare or infrequent taxa were observed, such as *Agaricus chionodermus* Pilát 1951, *A. gennadii* (Chatin & Boud.) P.D. Orton 1960, *A. langei* (F.H. Møller & Jul. Schäff.) Maire 1952, *A. lanipes* (F.H. Møller & Jul. Schäff.) Singer 1949, *Battarrea phalloides* (Dicks.) Pers. 1801, *Parasola megasperma* (P.D. Orton) Redhead et al. 2001, *Cortinarius bisporiger* Contu 1992, *Crepidotus calolepis* (Fr.) P. Karst. 1879, *Descomyces albus* (Berk.) Bougher & Castellano 1993, *Geastrum schmidelii* Vittad. 1842, *Inocybe arenicola* (R. Heim) Bon 1983, *I. dulcamara* (Alb. & Schwein.) P. Kumm. 1871, *I. dunensis* P.D. Orton 1960, *I. heimii* Bon 1984, *I. rufuloides* Bon 1984, *Lactarius hepaticus* Plowr. 1905, *Lamprospora crouanii* (Cooke) Seaver 1914, *Leucoagaricus menieri* (Sacc.) Singer 1968, *L. pilatianus* (Demoulin) Bon & Boiffard 1976, *L. salmoneophyllus* Bon & Guinb. 1993, *L. wichanskyi* (Pilát) Bon & Boiffard 1974, *Limacella illinita* (Fr.) Maire 1933, *L. subfurnacea* Contu 1990, *Lyophyllum buxeum* (Maire) Singer 1943, *L. littoralis* (Ballero & Contu) Contu 1998, *Marasmius corbariensis* (Roum.) Sacc. & Trotter 1911, *Melanoleuca tristis* M.M. Moser 1991, *Omphalina galericolor* (Romagn.) M.M. Moser 1975 var. *galericolor,* and *Psathyrella melanthina* (Fr.) Kits van Wav. 1985. The presence of *L. buxeum*, a rare Mediterranean species, is noteworthy and within in Italy confined to Sicily (Contu & Signorello 1999, Signorello & Contu 1998, Contu & La Rocca 1999, La Rocca & Bazan 2001, Lantieri 2003) and Sardinia (Contu & La Rocca 1999).

Other taxa that are not included in any vegetational belts but are rare or previously unreported include *Leucoagaricus singeri* (Bon ex Contu & Signor.) Cons. & Contu 2004, *Trametes ljubarskyi* Pilát 1937, and *Xerula xeruloides* (Bon) Dörfelt 1980. The presence of hypogeous or semi-hypogeous fungi — *Descomyces albus*, *Hydnangium carneum* Wallr. 1839, *Hysterangium inflatum* Rodway 1918, *Reddellomyces donkii* (Malençon) Trappe et al. 1992, *Pisolithus arhizus* (Scop.) Rauschert 1959, *Setchelliogaster tenuipes* (Setch.) Pouzar 1958 — is not strictly linked to *E. camaldulensis* but also to *A. saligna*. Apart from the basidiomycete *Arrhenia rickenii* (Hora) Watling 1989, moss-associated species (6 parasites, 4 saprophytes) belong to *Ascomycetes*. Some are rare (e.g., *Ciboria polygoni-vivipari* Eckblad 1969, *Lamprospora dictydiola* Boud. 1907, *Octospora convexula* (Pers.) L.R. Batra 1963) while others are uncommon (e.g., *L. crouanii*,

Octospora humosa (Fr.) Dennis 1960, *O. leucoloma* Hedw. 1789). *Pustularia patavina* (Cooke & Sacc.) Boud. 1907, a very uncommon species reported from Italy in Tuscany (Franchi et al. 2001) and Sicily (La Rocca & Bazan 2001, Lantieri 2004), is noteworthy. A huge number of lignicolous species were collected from stumps, rot roots, and other plant residues deposited on the beach. Among the limited fungi that grow on burnt areas are the strictly anthracophilous *Anthracobia melaloma* (Alb. & Schwein.) Arnould 1893, *Panaeolus guttulatus* Bres. 1881, *Peziza violacea* Pers. 1794 and *Plicaria endocarpoides* (Berk.) Rifai 1968.

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